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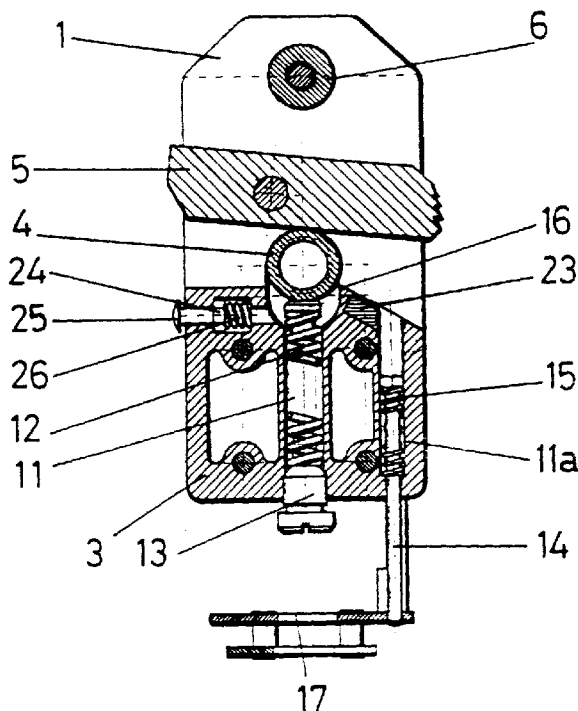
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### (54) Brake for large doors

(57) Brake for large doors, constituted by two side plates (1,2), separated by a central core (3) provided with two parallel conduits, one of which (11), ends opposite to the axle (4) from which the large door is suspended, which is mounted in two oblong openings (16)

and on which the braking pawl (5) acts, the other conduit (11a) serving for the axially displaceable trajectory of a rod (14) which is capable of acting directly on the braking pawl (5) and which is capable of being activated manually once the trigger (18) which acts as safety device and is loaded with a spring (20), has been removed.



**FIG.3**

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## Description

[0001] The present invention refers to a brake for large doors, and more specifically, to a brake for large doors and for any other machine which moves along vertical guides. The large doors and the mechanism of the indicated type are suspended by means of cables and/or drive chains which are connected to the activating mechanism, by means of which, the hoisting or lowering of said machines is attained sliding along vertical guides. This system of assembly presents the risk of breakage of the suspension-drive cable or chain, which would cause the free fall or collapse of the machine or large door.

[0002] It is known that in order to eliminate this risk, the machines and large doors of vertical movement are equipped with brakes which cause their detention or tie-down, when a free fall is produced due to the effect of breakage of the suspension cable.

[0003] A brake for the purpose indicated is for example described in Utility Model No. 9101061 of the same applicant, which comprises a "U"-shaped frame made up of two parallel plates and of an end intermediate joining body.

[0004] Between the plates of this frame is assembled, parting from the intermediate body, a locking pawl, a suspension axle of the large door and a pulley for the passage of the suspension cable. The suspension axle is provided, outside the frame with assembled rolling elements for bearing on profiles or vertical rails which serve as sliding guides of the large door. Through the intermediate body is assembled an elastic element which is capable of impulsing the pawl towards its locking position, when breakage of the suspension cable occurs. The brake also includes a second auxiliary locking pawl which is assembled on the outside of one of the plates which make up the frame.

[0005] With the described constitution the risk exists that the pawl may be accidentally moved towards the locking position, during a normal movement of the large door, which would force unlocking operations to be conducted.

[0006] On the other hand, the constitution of the brake is further complicated by the existence of the auxiliary pawl.

[0007] The object of the present invention is to remove the indicated disadvantages, by simplifying the constitution of the brake and providing the same with means which assure the unlocking position of the pawl and which permit the obtention of a smoother and more silent operation.

[0008] Another objective of the invention is to provide the brake with manual activation means of the locking pawl, which are easily accessible and safe.

[0009] The brake of the invention is of the type initially indicated and is characterized in that it includes a safety element activation of the pawl, of manual activation, which is made up of a rod which is assembled in the

frame, in a hole longitudinally penetrating through the intermediate body in perpendicular direction to the suspension axle of the door, this hole being additionally placed towards the side of the teeth on the pawl. Said rod can move axially towards an activating position on the pawl, in which it extends from the intermediate body between the parallel plates, and pushes said pawl towards its locking position, and another position of attack, in which the rod remains retracted within the intermediate body. The rod is constantly impulsed towards the attack position by means of a spring housed within the hole of the intermediate body.

[0010] The rod which forms the described safety device, is finished off on the outside into an elbowed section in which a trigger is assembled, which permits the locking of said rod in its position of rest.

[0011] According to another characteristic of the invention, the intermediate body is also assembled with a magnet which remains placed in opposed position to the pawl, to the teeth on the side of the same. This magnet attracts and retains the pawl in the inactive or rest position, passing, from this position to that of the active or locking position by the external action due to the breakage of the suspension cable of the large door or by the activation of the previously indicated safety device.

[0012] The characteristics of the invention is herewith described in greater detail, with the help of the enclosed drawings, in which an exemplary, non limitative embodiment is shown.

[0013] In the drawings:

[0014] Figure 1 is a front elevational view of a brake, constituted according to the invention.

[0015] Figure 2 is a left hand, side elevational view of the brake of figure 1.

[0016] Figure 3 is a longitudinal cross section of the brake, taken on line III-III of figure 2.

[0017] Figure 4 is a cross section of the locking trigger of the activating safety device, taken on line IV-IV of figure 1.

[0018] The brake shown in the drawings comprises a frame formed by two parallel plates, referenced with numbers 1 and 2, and by an intermediate end body 3, these three components remaining joined to each other by means of rivets or screws.

[0019] Between plates 1 and 2 of the frame, an axle 4 is assembled, from which the large door or machinery shall be suspended, a locking pawl 5 and a pulley 6 for the passage of a suspension cable.

[0020] Axle 4 extends on one side into a threaded section 7, to which the large door or machinery shall be attached by means of nuts 8, whilst on the opposite side it extends into a portion on which a rolling element 9 is assembled which carries an external bushing 10 for bearing on the vertical profiles or rails which serve as guides for the sliding of the large door.

[0021] The intermediate body 3 presents, as may be best appreciated from figure 3, a central longitudinal hole 11 in which a compression spring 12 is assembled,

externally retained by a plug 13, whilst it abuts on the upper part against the axle 4 for suspension of the large door.

**[0022]** The intermediate body 3 is also provided with another longitudinal hole 11a, parallel to hole 11 and displaced towards the side of the teeth of the pawl 5. Inside this hole is assembled a rod 14 which may axially move between an activation position, in which it extends from the intermediate body 3, between plates 1 and 2, and pushes the pawl 5 towards the locking position shown in figure 3, and another capable of being activated, shown in figure 3, in which it remains retracted within the hole 11a. The rod 14 is constantly impulsed towards this attack position by means of a spring 15.

**[0023]** With the constitution indicated, when the brake or brakes which support the large door remain hanging on the cables which pass through the pulley 6, the weight of the large door makes the axle 4 occupy the lower part of the slit openings 16 of plates 1 and 2 and, in consequence, the pawl 5 passes on to the position of rest, at the same time that the spring 12 compresses. If the breakage of the suspension cable should occur, the force which compresses the spring 12 would cease, and this would impulse axle 4 towards the top position of the slit openings 16, pushing the pawl 5 towards the locking position shown in figure 3, in which the teeth of the pawl would act on the surface of the rails or guides.

**[0024]** The displacement of the pawl 5 from the position of rest to that of the lock position shown in figure 3 can also be achieved by means of the activation of the safety device defined by the rod 14. If this rod is pushed in ascending direction, overcoming the force of spring 15, said rod shall abut against the pawl 5 and shall push it towards the locking position shown in figure 3.

**[0025]** As is shown in the drawings, rod 14 is externally finished off into an elbowed section 17 in which a trigger 18 is assembled which, as can be better appreciated from figure 4, is made up of a bushing 18, attachable to the elbowed section 17 of the safety device, and an internal core 19, displaceable between the maximum and minimum retracted positions, being impulsed towards the minimum retraction position by means of a spring 20. The core 19 is finished off into an external head equipped with a notch or groove 21 which fits into an opposed sheet 22, forming integral part of the frame. When core 19 is placed in such a manner, that the groove 21 fits into sheet 22, rod 14 remains locked, so that the safety device cannot be activated manually. Retracting core 19, the safety device is freed and in consequence, it is possible to act manually on the pawl 5.

**[0026]** According to another characteristic of the invention, the intermediate body 3 of the frame is provided with an assembled magnet 23 placed in opposed position to the pawl 5, on the side of the teeth of the same. The mission of this magnet is to attract and maintain the pawl in the inactive position, preventing that it might accidentally reach the active or braking position, shown in the drawing.

**[0027]** With the described constitution, the pawl 5 shall reach the locking position only when the break of the suspension cable is produced or else, when the manual safety device 14 is activated, with the prior freeing of trigger 18.

**[0028]** With the object of obtaining a more silent operation and to reduce the vibrations of the brake or suspended large door, the intermediate body 3 of the frame is provided with an assembled pin 24 in transversal direction which extends on the side opposite to the one occupied by the teeth of the pawl 5 on a head 25, with rounded configuration. This pin can be displaced between maximum and minimum extraction positions and is impulsed constantly towards the maximum extraction position by means of a spring 26. The head 25 of the pin 24 shall abut on the surface in opposition to the profile or rail which serves as guide of the brake, preventing that it might vibrate or move, for example due to oscillations of the large door, defining a sliding skid with which a smoother and more silent operation is obtained.

**[0029]** The brake of the invention prevents accidental braking and at the same time two functions are attained with one single pawl: a manual braking at any moment during the height, by means of a comfortable activation, and braking by breaking of the suspension cable. Additionally the lubrication of the rolling element 9 is improved, since the bushing 10 of the same works on a different track or surface than the teeth of the pawl 5.

## Claims

1. Brake for large doors, constituted by two parallel plates (1,2) and an intermediate joining body (3), its assembly delimiting a "U"-shaped frame between the branches (1,2) of which are mounted, parting from said intermediate body (3) a suspension axle (4) for the large door, a locking pawl (5), and a pulley (6) for the passage of a suspension cable, the large door suspension axle (4) being the carrier of external rolling elements (9, 10) for abutting on sliding guides, whilst through the intermediate body (3) is mounted an elastic element (12) which abuts on the large door suspension axle (4) and impulses the pawl (5) towards the locking position, characterised in that it comprises an activation safety device of the pawl (5), of manual activation, which is constituted by a rod (14) which is mounted in a through hole (11a) made on the intermediate body (3), in longitudinal direction and displaced towards the side of the teeth of the pawl (5), the rod (14) being capable of axial displacement between an activation position, in which it extends from the intermediate body (3), between the parallel plates (1,2) and pushes the pawl (5) towards its locking position, and another capable of activation in which it remains retracted within the intermediate body (3), the rod (14) being constantly impulsed towards this activated

position by means of a spring (15) housed inside the hole (11a) of the intermediate body (3), the rod (14) being finished off externally in an elbowed section (17) on which a trigger (18) is assembled for the locking of said rod (14) in the position of rest; and in that said intermediate body (3) is also provided with an assembled magnet (23) placed in opposed position to the pawl (5), on the side of the teeth of said pawl, for its retention in the inactive position, passing from this position to the active or braking position due to the breaking of the suspension cable of the large door or by the activation of said rod (14).

2. Brake according to claim 1, characterized in that said locking trigger (18) consists of a bushing (18') which is attached on the elbowed section (17) of the rod (14) and houses a core impulsed towards a position of maximum extraction by means of a spring (20) mounted inside the bushing; said core presenting, on the external section a notch (21) which fits into an opposed locking sheet (22) which forms integral part of the frame formed by the plates and intermediate body.

3. Brake according to claim 1, characterized in that the intermediate body (3) is provided with an assembled pin (34) in transversal direction which extends on the side, on the opposite side to the teeth of the pawl (5), on a bearing head (25) and is displaceable between positions of maximum and minimum extraction, being constantly impulsed towards the position of maximum extraction by means of a spring (26).

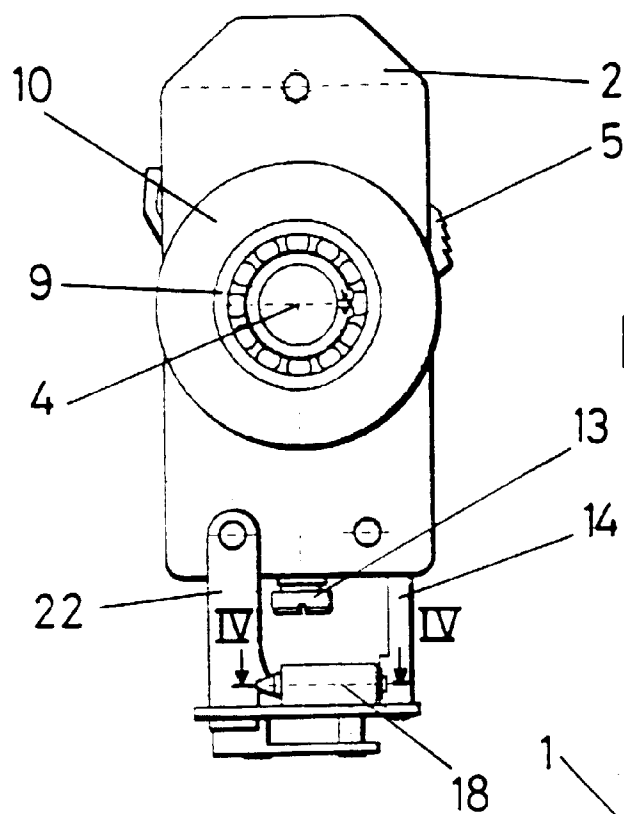


FIG.1

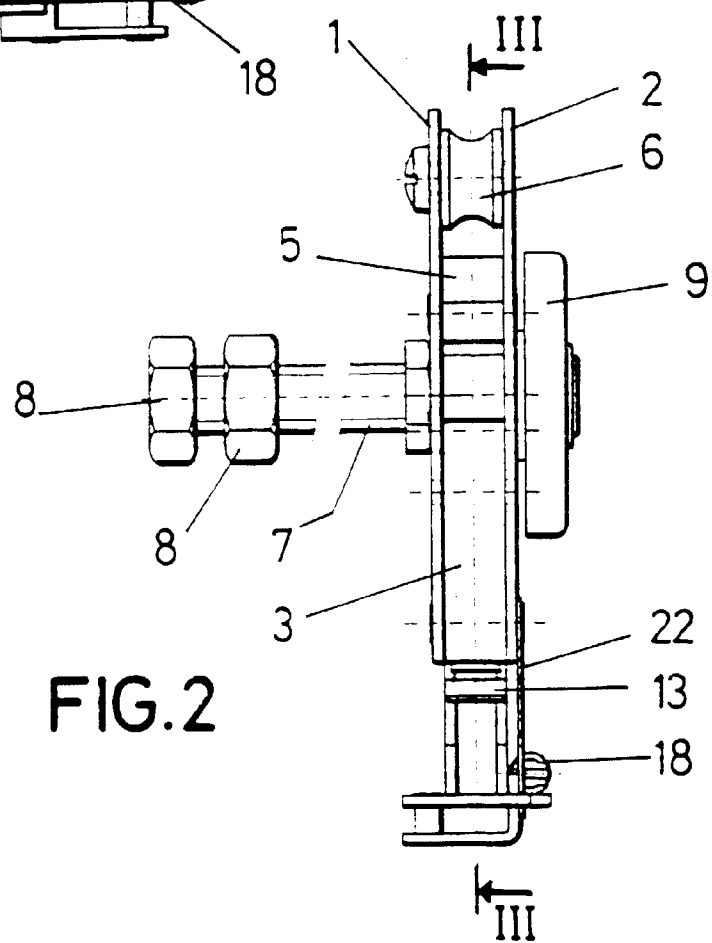


FIG.2

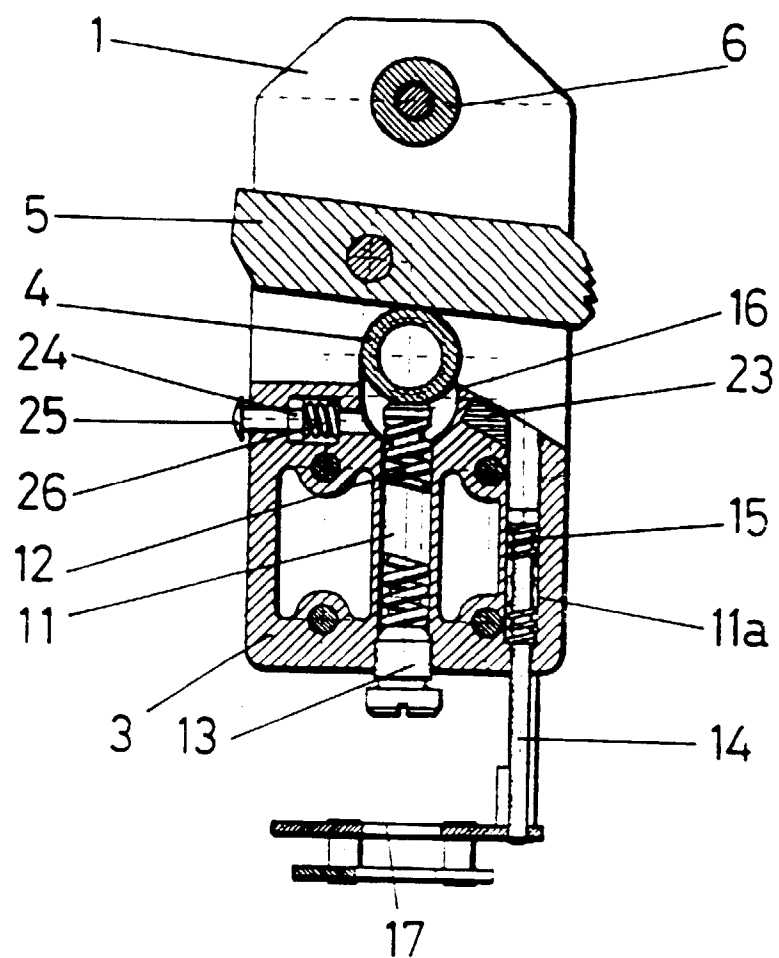


FIG. 3

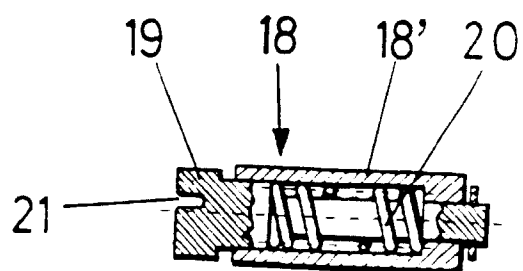


FIG. 4